

Contemporary Topics in the Use of Erbium Lasers (cont'd)
Saturday, April 17, 2010, 11:32 a.m. – 11:47 a.m., Breakout Session
Student Scholarship Award Presentation

511-AM3 – Er:YAG Laser Debonding of Porcelain Veneers

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Removal of porcelain veneers using Er:YAG lasers has been described in case reports. The aim of this study was to systematically investigate the use of an Er:YAG laser for veneer removal without destroying the veneer as well as without aggressive destruction or removal of underlying tooth substance.

Materials and Methods: In a first step, Fourier Transform Infrared (FTIR) Spectroscopy (Nicolet™ FT-IR Spectrometer, Thermo Fisher Scientific, Waltham, Mass., USA) was used on two different, flat veneer materials (IPS Empress® Esthetic, IPS e.max Press HT, Ivoclar Vivadent, Inc, Amherst, N.Y., USA) to learn which infrared laser wavelengths are transmitted through the veneer material and how strong absorption of the veneer materials is in the infrared spectral range.

A laser energy meter (Energy Max 400, Molecron Detector, Inc., Portland, Ore., USA) was used to determine the energy transmission dependence on veneer thickness for the Er:YAG laser wavelength (2940 nm). In addition, the FTIR characteristics and ablation thresholds of a veneer bonding cement (RelyX™ Veneer Cement shade A1, 3M ESPE, St. Paul, Minn., USA) were determined.

Next, 25 extracted anterior incisors (n = 12 for IPS Empress Esthetic, n = 13 for IPS e.max Press HT) were prepared for labial veneers placing; impressions were made, veneers were produced (2 different porcelains), thickness of the veneers were determined (Mitutoyo micrometer, Mitutoyo America, Aurora, Ill., USA), and the veneers were placed using a cement (RelyX™ Veneer Cement shade A1). An Er:YAG laser (LiteTouch™, Syneron™ Dental Lasers, Yokneam, Israel; wavelength 2940 nm, pulse repetition rate 10 Hz, pulse energy 135 mJ/pulse [laser energy measured independently at the fiber tip], free-running pulse, with a measured pulse duration of 150 μs at this energy level, 1,100-μm straight quartz fiber tip, contact mode, air spray). Three samples per veneer material were stored for 5 days in saline solution at room temperature prior to debonding. All other veneers were removed immediately after bonding. Incident Light Microscopy (Olympus B 50, MicroPublisher RTV 3.3 MP, Image Pro software, Olympus, Center Valley, Pa., USA) and Environmental Scanning Electron Microscopy (ESEM, ISI SX-40A, Topcon Instruments, Inc., Livermore, Calif., USA) were used to evaluate the interface of veneer/cement and cement/tooth structure in order to better understand the debonding process.

Results: In all test samples, porcelain veneers can easily and completely be removed from the teeth with an Er:YAG laser. Moreover, underlying tooth substances can be totally preserved. The removal process is time-efficient. In the case of the IPS Empress Esthetic veneers, the majority of the veneers fractured during the removal. In contrast, all IPS e.max Press HT veneers remained intact during the laser removal process.

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Conclusions: Using an Er:YAG laser to debond porcelain veneers allows the dentist to reuse the veneer in cases when a veneer initially was “misplaced.” The need of redoing the veneer can be omitted. Removal of old veneers is simplified and tooth substance is maximally preserved to place a new veneer.

This presentation discusses investigational devices that have not yet received U.S. FDA approval or clearance for the specified clinical indications, or describes off-label uses.

Biography: *Dr. Cynthia Morford grew up in the San Francisco Bay Area, California. She attended the University of California, Berkeley for her undergraduate education and later attended the University of California, Los Angeles for her dental degree. Dr. Morford is currently a second-year resident in the Postgraduate Prosthodontic program at University of California, San Francisco.*

Disclosure: *Dr. Morford has no commercial or financial interest relative to this presentation.*

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